HEALTH DEVELOPMENT

Health development is defined as "the process of continuous progressive improvement of the health status of a population" *(53)*. Its product is rising level of human well-being, marked not only by reduction in the burden of disease, but also by the attainment of positive physical and mental health related to satisfactory economic functioning and social integration *(54)*.

The concept of **health development** as distinct from the provision of medical care is a product of recent policy thinking. It is based on the fundamental principle that governments have a responsibility for the health of their people and at the same time people should have the right as well as the duty, individually and collectively to participate in the development of their own health.

Health development contributes to and results from social and economic development. Therefore, health development has been given increasing emphasis in the policies and programmes of the United Nations system. One example is that of World Bank which is providing funds for the health component of economic development programmes. The UNDP has also shown a growing interest in health development, as has the World Bank.

INDICATORS OF HEALTH

A question that is often raised is: How healthy is a given community ? Indicators are required not only to measure the health status of a community, but also to compare the health status of one country with that of another; for assessment of health care needs; for allocation of scarce resources; and for monitoring and evaluation of health services, activities, and programmes. Indicators help to measure the extent to which the objectives and targets of a programme are being attained.

As the name suggests, indicators are only an indication of a given situation or a reflection of that situation. In WHO's guidelines for health programme evaluation *(55)* they are defined as **variables** which help to measure changes. Often they are used particularly when these changes cannot be measured directly, as for example health or nutritional status *(54)*. If measured sequentially over time, they can indicate direction and speed of change and serve to compare different areas or groups of people at the same moment in time *(55)*.

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of health.

Further, health is multidimensional, and each dimension is influenced by numerous factors, some known and many unknown. This means we must measure health multidimensionally. Thus the subject of health measurement is a complicated one even for professionals. Our understanding of health, therefore, cannot be in terms of a single indicator; it must be conceived in terms of a profile, employing many indicators, which may be classified as:

1. Mortality indicators
2. Morbidity indicators
3. Disability rates
4. Nutritional status indicators
5. Health care delivery indicators
6. Utilization rates
7. Indicators of social and mental health
8. Environmental indicators
9. Socio-economic indicators
10. Health policy indicators
11. Indicators of quality of life, and
12. Other indicators.

1. Mortality indicators

(a) *Crude death rate:* This is considered a fair indicator of the comparative health of the people. It is defined as the number of deaths per 1000 population per year in a given

community. It indicates the rate at which people are dying. Strictly speaking, health should not be measured by the number of deaths that occur in a community. But in many countries, the crude death rate is the only available indicator of health. When used for international comparison, the usefulness of the crude death rate is restricted because it is influenced by the age–sex composition of the population. Although not a perfect measure of health status, a decrease in death rate provides a good tool for assessing the overall health improvement in a population. Reducing the number of deaths in the population is an obvious goal of medicine and health care, and success or failure to do so is a measure of a nation's commitment to better health.

(b) *Expectation of life :* Life expectancy at birth is "the average number of years that will be lived by those born alive into a population if the current age-specific mortality rates persist". Life expectancy at birth is highly influenced by the infant mortality rate where that is high. Life expectancy at the age of 1 excludes the influence of infant mortality, and life expectancy at the age of 5 excludes the influence of child mortality. Life expectancy at birth is used most frequently *(57)*. It is estimated for both sexes separately. An increase in the expectation of life is regarded, inferentially, as an improvement in health status.

Life expectancy is a good indicator of socio-economic development in general. As an indicator of long-term survival, it can be considered as a positive health indicator. It has been adopted as a global health indicator.

(c) *Age-specific death rates :* Death rates can be expressed for specific age groups in a population which are defined by age. An age-specific death rate is defined as total number of deaths occurring in a specific age group of the population (e.g. 20–24 years) in a defined area during a specific period per 1000 estimated total population of the same age group of the population in the same area during the same period.

(d) *Infant mortality rate :* Infant mortality rate is the ratio of deaths under 1 year of age in a given year to the total number of live births in the same year; usually expressed as a rate per 1000 live births *(56)*. It is one of the most universally accepted indicators of health status not only of infants, but also of whole population and of the socio-economic conditions under which they live. In addition, the infant mortality rate is a sensitive indicator of the availability, utilization and effectiveness of health care, particularly perinatal care.

(e) *Child mortality rate :* Another indicator related to the overall health status is the early childhood (1–4 years) mortality rate. It is defined as the number of deaths at ages 1–4 years in a given year, per 1000 children in that age group at the mid-point of the year concerned. It thus excludes infant mortality.

Apart from its correlation with inadequate MCH services, it is also related to insufficient nutrition, low coverage by immunization and adverse environmental exposure and other exogenous agents. Whereas the IMR may be more than 10 times higher in the least developed countries than in the developed countries, the child mortality rate may be as much as 25 times higher. This indicates the magnitude of the gap and the room for improvement.

(f) *Under–5 proportionate mortality rate :* It is the proportion of total deaths occurring in the under–5 age group. This rate can be used to reflect both infant and child mortality rates. In communities with poor hygiene, the proportion may

exceed 60 per 1000 live births. In some European countries, the proportion is less than 2 per 1000 live births. High rate reflects high birth rates, high child mortality rates and shorter life expectancy *(26)*.

(g) *Adult mortality rate :* The adult mortality rate is defined as the probability of dying between the age of 15 and 60 years per 1000 population. The adult mortality rate offers a way to analyze health gaps between countries in the main working groups. The probability of dying in adulthood is greater for men than for women in almost all countries, but the variations between countries is very large. In Japan, less than 1 in 10 men (and 1 in 20 women) die in these productive age group, compared to almost 2–3 in 10 men (and 1–2 women) in Angola *(58)*.

(h) *Maternal (puerperal) mortality rate :* Maternal (puerperal) mortality accounts for the greatest proportion of deaths among women of reproductive age in most of the developing world. There are enormous variations in maternal mortality rate according to country's level of socio-economic status.

(i) *Disease-specific mortality rate :* Mortality rates can be computed for specific diseases. As countries begin to extricate themselves from the burden of communicable diseases, a number of other indicators such as deaths from cancer, cardiovascular diseases, accidents, diabetes, etc have emerged as measures of specific disease problems.

(j) *Proportional mortality rate :* The simplest measure of estimating the burden of a disease in the community is proportional mortality rate, i.e., the proportion of all deaths currently attributed to it. For example, coronary heart disease is the cause of 25 to 30 per cent of all deaths in most western countries. The proportional mortality rate from communicable diseases has been suggested as a useful health status indicator; it indicates the magnitude of preventable mortality.

(k) *Case fatality rate :* Case fatality rate measures the risk of persons dying from a certain disease within a given time period. Case fatality rate is calculated as number of deaths from a specific disease during a specific time period divided by number of cases of the disease during the same time period, usually expressed as per 100. The case fatality rate is used to link mortality to morbidity. One function of the case fatality rate is to measure various aspects or properties of a disease such as its pathogenicity, severity or virulence *(59)*. It can also be used in poisonings, chemical exposures or other short-term non-disease cause of death.

(l) *Years of potential life lost (YPLL) :* Years of potential life lost is based on the years of life lost through premature death. It is defined as one that occurs before the age to which a dying person could have expected to survive (before an arbitrary determined age, usually taken age 75 years). A 30 year old who dies in a road accident could theoretically have lived to an average life expectancy of 75 years of age; thus 45 years of life are lost.

Mortality indicators represent the traditional measures of health status. Even today they are probably the most often used indirect indicators of health. As infectious diseases have been brought under control, mortality rates have declined to very low levels in many countries. Consequently mortality indicators are losing their sensitivity as health indicators in developed countries. However, mortality indicators continue to be used as the starting point in health status evaluation.

2. Morbidity indicators

To describe health in terms of mortality rates only is misleading. This is because, mortality indicators do not reveal the burden of ill-health in a community, as for example mental illness and rheumatoid arthritis. Therefore, morbidity indicators are used to supplement mortality data to describe the health status of a population. Morbidity statistics have also their own drawback; they tend to overlook a large number of conditions which are subclinical or inapparent, that is, the hidden part of the iceberg of disease.

The following morbidity rates are used for assessing ill-health in the community *(60)*.

a. incidence and prevalence
b. notification rates
c. attendance rates at out-patient departments, health centres, etc.
d. admission, readmission and discharge rates
e. duration of stay in hospital, and
f. spells of sickness or absence from work or school.

3. Disability rates

Since death rates have not changed markedly in recent years, despite massive health expenditures, disability rates related to illness and injury have come into use to supplement mortality and morbidity indicators. The disability rates are based on the premise or notion that health implies a full range of daily activities. The commonly used disability rates fall into two groups: (a) Event–type indicators and (b) person–type indicators *(10, 61)*.

(a) *Event–type indicators*

i) Number of days of restricted activity
ii) Bed disability days
iii) Work-loss days (or school-loss days) within a specified period

(b) *Person–type indicators*

i) *Limitation of mobility*: For example, confined to bed, confined to the house, special aid in getting around either inside or outside the house.
ii) *Limitation of activity*: For example, limitation to perform the basic activities of daily living (ADL)–e.g., eating, washing, dressing, going to toilet, moving about, etc; limitation in major activity, e.g., ability to work at a job, ability to housework, etc.

HALE (Health-Adjusted Life Expectancy) : The name of the indicator used to measure healthy life expectancy has been changed from disability–adjusted life expectancy (DALE) to health–adjusted life expectancy (HALE). HALE is based on life expectancy at birth but includes an adjustment for *time spent in poor health*. It is most easily understood as the equivalent number of years in full health that a newborn can expect to live based on current rates of ill-health and mortality.

Quality-adjusted life years (QALY) : QALY is a measure of disease burden including both the quality and quantity of life lived. It is used in assessing the value for money of a medical intervention. The QALY is based on the number of years of life that would be added by intervention. Each year in perfect health is assigned a value of 1.0 down to a value of 0.0 for death, i.e. 1 QALY (1 year of life × 1 utility value = 1 QALY) is a year of life lived in perfect health. Half a year lived in perfect health is equivalent to 0.5 QALY (1 year × 0.5 utility value).

Disability-free life expectancy (Syn : active life expectancy) : Disability-free life expectancy (DFLE) is the average number of years an individual is expected to live free of disability if current pattern of mortality and disability continue to apply *(62)*.

Disability-adjusted life years (DALY) : DALY is a measure of overall disease burden, expressed as a number of years lost due to ill-health, disability or early death. Originally developed by Harvard University for the World Bank in 1990, the WHO subsequently adopted the method in the year 2000. The DALY is becoming increasingly common in the field of public health and health impact assessment. The Global Burden of Disease project combines the impact of premature mortality with that of disability. It captures the population impact of important fatal and non-fatal disabling conditions through a single measure. The major measure used is disability–adjusted life years (DALYs) which combines *(58)* :

- years of lost life (YLL) – calculated from the number of deaths at each age multiplied by the expected remaining years of life according to a global standard life expectancy
- years lost to disability (YLD) where the number of incident cases due to injury and illness is multiplied by the average duration of the disease and a weighting factor reflecting the severity of the disease on a scale from 0 (perfect health) to 1 (dead).

It is calculated by formula : DALY = YLL + YLD

The DALY relies on an acceptance that the most appropriate measure of the effects of the chronic illness is time. One DALY, therefore, is equal to one year of healthy life lost. Japanese life expectancy statistics are used as a standard for measuring premature death, as Japanese have the longest life expectancy.

DALY can reveal surprising things about a population's health. For example, the 1990 WHO report indicated that 5 out of 10 leading causes of disability were psychiatric conditions. Psychiatric and neurological conditions account for about 28 per cent of years lived with disability, but accounts for only 1.4 per cent of all deaths and 1.1 per cent of years of life lost. Thus they have a huge impact on population. A crucial distinction among DALY studies is the use of "social weighting", in which the value of each year of life depends on age. Commonly, years lived as a young adult are valued more highly than years spent as a young child or older adults. This weighting system reflects societie's interest in productivity and receiving a return on its investment in upbringing of the children. The effects of the interplay between life expectancy and years lost, discounting, and social weighting are complex, depending on the severity and duration of illness.

5. Health care delivery indicators

The frequently used indicators of health care delivery are:

a. Doctor–population ratio
b. Doctor–nurse ratio
c. Population–bed ratio
d. Population per health/subcentre, and
e. Population per traditional birth attendant.

These indicators reflect the equity of distribution of health resources in different parts of the country, and of the provision of health care.

6. Utilization rates

In order to obtain additional information on health status, the extent of use of health services is often investigated. Utilization of services – or actual coverage – is expressed as the proportion of people in need of a service who actually receive it in a given period, usually a year (57). It is argued that utilization rates give some indication of the care needed by a population, and therefore, the health status of the population. In other words, a relationship exists between utilization of health care services and health needs and status. Health care utilization is also affected by factors such as availability and accessibility of health services and the attitude of an individual towards his health and the health care system. A few examples of utilization rates are cited below:

a. proportion of infants who are "fully immunized" against the 6 EPI diseases.
b. proportion of pregnant women who receive antenatal care, or have their deliveries supervised by a trained birth attendant.
c. percentage of the population using the various methods of family planning.
d. bed–occupancy rate (i.e., average daily in-patient census/average number of beds).
e. average length of stay (i.e., days of care rendered/ discharges), and
f. bed turnover ratio (i.e., discharges/average beds).

The above list is neither exhaustive nor all–inclusive. The list can be expanded depending upon the services provided. These indicators direct attention away from the biological aspects of disease in a population towards the discharge of social responsibility for the organization in delivery of health care services.

7. Indicators of social and mental health

As long as valid positive indicators of social and mental health are scarce, it is necessary to use indirect measures, viz. *indicators of social and mental pathology.* These include suicide, homicide, other acts of violence and other crime; road traffic accidents, juvenile delinquency; alcohol and drug abuse; smoking; consumption of tranquillizers; obesity, etc *(57)*. To these may be added family violence, battered–baby and battered–wife syndromes and neglected and abandoned youth in the neighbourhood. These social indicators provide a guide to social action for improving the health of the people.

8. Environmental indicators

Environmental indicators reflect the quality of physical and biological environment in which diseases occur and in which the people live. They include indicators relating to

pollution of air and water, radiation, solid wastes, noise, exposure to toxic substances in food or drink. Among these, the most useful indicators are those measuring the proportion of population having access to safe water and sanitation facilities, as for example, percentage of households with safe water in the home or within 15 minutes' walking distance from a water standpoint or protected well; adequate sanitary facilities in the home or immediate vicinity *(57)*.

9. Socio-economic indicators

These indicators do not directly measure health. Nevertheless, they are of great importance in the interpretation of the indicators of health care. These include :

a. rate of population increase
b. per capita GNP
c. level of unemployment
d. dependency ratio
e. literacy rates, especially female literacy rates
f. family size
g. housing: the number of persons per room, and
h. per capita "calorie" availability.

10. Health policy indicators

The single most important indicator of political commitment is "allocation of adequate resources". The relevant indicators are: (i) proportion of GNP spent on health services (ii) proportion of GNP spent on health–related activities (including water supply and sanitation, housing and nutrition, community development), and (iii) proportion of total health resources devoted to primary health care.

11. Indicators of quality of life

Increasingly, mortality and morbidity data have been questioned as to whether they fully reflect the health status of a population. The previous emphasis on using increased life expectancy as an indicator of health is no longer considered adequate, especially in developed countries, and attention has shifted more towards concern about the quality of life enjoyed by individuals and communities. Quality of life is difficult to define and even more difficult to measure (see page 16). Various attempts have been made to reach one composite index from a number of health indicators. The physical quality of life index is one such index (see page 17). It consolidates three indicators, viz. infant mortality, life expectancy at age one, and literacy. Obviously more work is needed to develop indicators of quality of life.

12. Other indicators series

(a) *Social indicators* : Social indicators, as defined by the United Nations Statistical Office, have been divided into 12 categories:– population; family formation, families and households; learning and educational services; earning activities; distribution of income, consumption, and accumulation; social security and welfare services; health services and nutrition; housing and its environment; public order and safety; time use; leisure and culture; social stratification and mobility *(63)*.

(b) *Basic needs indicators* : Basic needs indicators are used by ILO. Those mentioned in "Basic needs

There has been some confusion over terminology: **health indicator** as compared to **health index** (plural: indices or indexes). It has been suggested that in relation to health trends, the term **indicator** is to be preferred to **index**, whereas **health index** is generally considered to be an amalgamation of health indicators *(56)*.

Characteristics of indicators

Indicators have been given scientific respectability; for example **ideal** indicators

a. should be **valid**, i.e., they should actually measure what they are supposed to measure;
b. should be **reliable** and objective, i.e., the answers should be the same if measured by different people in similar circumstances;
c. should be **sensitive**, i.e., they should be sensitive to changes in the situation concerned,
d. should be **specific**, i.e., they should reflect changes only in the situation concerned,
e. should be **feasible**, i.e., they should have the ability to obtain data needed, and;
f. should be **relevant**, i.e., they should contribute to the understanding of the phenomenon of interest.

But in real life there are few indicators that comply with all these criteria. Measurement of health is far from simple. No existing definition (including the WHO definition) contains criteria for measuring health. This is because health, like happiness, cannot be defined in exact measurable terms. Its presence or absence is so largely a matter of subjective judgement. Since we have problems in defining health, we also have problems in measuring health and the question is largely unresolved. Therefore, measurements of health have been framed in terms of illness (or lack of health), the consequences of ill-health (e.g., morbidity, disability) and economic, occupational and domestic factors that promote ill-health – all the antitheses of health.

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